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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,909	06/08/2005	Hideo Nagata	L9289.05146	6673

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EXAMINER	
HANNON, CHRISTIAN A	

ART UNIT	PAPER NUMBER
2618	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,909	NAGATA ET AL.	
	Examiner	Art Unit	
	Christian A. Hannon	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3 and 5* is/are rejected.

7)☒ Claim(s) *2,4 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/8/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 6/8/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3 & 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (US 7,142,615), hereinafter Hongo, in view of Shirali (US 7,085,330).

Regarding claim 1, Hongo teaches a distortion compensation table creation method comprising a step of finding a distortion component generated in an amplified signal when a baseband signal is amplified by relating frequency to power of said baseband signal (Column 2, Lines 19-26 & 30-35; Hongo) a step of finding an amplitude component and phase component in found said distortion component so as to be

related to said power for each said power (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) a step of finding a distortion compensation signal that has an amplitude component whereby an amplitude component in found said distortion component is an inverse amplitude with respect to an amplitude component of said amplified signal when said distortion component is not present and a phase component whereby a phase component in said distortion component is an inverse phase with respect to a phase component of said amplified signal when said distortion component is not present (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) and a step of relating found said distortion compensation signal and said power and performing storage in a table as compensation signal generation information for selecting said distortion compensation signal that suppresses said distortion component (Column 6, Lines 5-10; Hongo). However Hongo fails to teach the use of a conversion of the sampled data into the time domain. Shirali teaches a pre-distortion transmitter capable of converting a distortion component found into a time domain (Column 3, Lines 65-67; Column 4, Line 1; Shirali). Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Hongo with those of Shirali in order to provide matching input signals to matching output signals relative to time, thereby increasing the quality of the system.

Regarding claim 3, Hongo teaches a distortion compensation method comprising a step of finding a distortion component generated in an amplified signal resulting from amplifying a baseband signal with an amplifier by relating frequency to power of said baseband signal prior to a distortion component suppression operation (Column 2, Lines 19-26 & 30-35; Hongo) a step of finding an amplitude component and phase

component in said distortion component converted so as to be related to said power for each said power (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) a step of finding a distortion compensation signal that has an amplitude component whereby an amplitude component in found said distortion component is an inverse amplitude with respect to an amplitude component of said amplified signal when said distortion component is not present and a phase component whereby a phase component in said distortion component is an inverse phase with respect to a phase component of said amplified signal when said distortion component is not present (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) a step of relating found said distortion compensation signal and said power and performing storage in a table as compensation signal generation information for selecting said distortion compensation signal that suppresses said distortion component (Column 6, Lines 5-10; Hongo) a step of measuring power of a baseband signal of said distortion component suppression operation (Column 15, Lines 52-54; Hongo) a step of selecting said distortion compensation signal by referencing said compensation signal generation information using information of measured said power (Column 15, Lines 55-67; Hongo) a step of combining said baseband signal and selected said distortion compensation signal (Column 15, Lines 55-67; Hongo) and a step of suppressing with said distortion compensation signal said distortion component generated by amplifying with said amplifier said baseband signal with which said distortion compensation signal has been combined (Column 15, Lines 55-67; Hongo). However Hongo fails to teach the use of a conversion of the sampled data into the time domain. Shirali teaches a pre-distortion transmitter capable of

converting a distortion component found into a time domain (Column 3, Lines 65-67; Column 4, Line 1; Shirali). Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Hongo with those of Shirali in order to provide matching input signals to matching output signals relative to time, thereby increasing the quality of the system.

Regarding claim 5, Hongo teaches A transmitting method comprising a step of finding a distortion component generated in an amplified signal resulting from amplifying a baseband signal with an amplifier by relating frequency to power of said baseband signal prior to a distortion component suppression operation (Column 2, Lines 19-26 & 30-35; Hongo) a step of finding an amplitude component and phase component in said distortion component converted so as to be related to said power for each said power (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) a step of finding a distortion compensation signal that has an amplitude component whereby an amplitude component in found said distortion component is an inverse amplitude with respect to an amplitude component of said amplified signal when said distortion component is not present and a phase component whereby a phase component in said distortion component is an inverse phase with respect to a phase component of said amplified signal when said distortion component is not present (Column 5, Lines 66-67; Column 6, Lines 1-5; Hongo) a step of relating found said distortion compensation signal and said power and performing storage in a table as compensation signal generation information for selecting said distortion compensation signal that suppresses said distortion component (Column 6, Lines 5-10; Hongo) a step of measuring power of a

baseband signal of said distortion component suppression operation (Column 15, Lines 52-54; Hongo) a step of selecting said distortion compensation signal by referencing said compensation signal generation information using information of measured said power (Column 15, Lines 55-67; Hongo) a step of combining said baseband signal and selected said distortion compensation signal (Column 15, Lines 55-67; Hongo) and a step of suppressing with said distortion compensation signal said distortion component generated by amplifying with said amplifier said baseband signal with which said distortion compensation signal has been combined (Column 15, Lines 55-67; Hongo) and a step of transmitting said baseband signal in which said distortion component has been suppressed by said distortion compensation signal (Column 15, Lines 49-51; Hongo). However Hongo fails to teach the use of a conversion of the sampled data into the time domain. Shirali teaches a pre-distortion transmitter capable of converting a distortion component found into a time domain (Column 3, Lines 65-67; Column 4, Line 1; Shirali). Therefore it would have been obvious to one of ordinary skill in the art to combine the teachings of Hongo with those of Shirali in order to provide matching input signals to matching output signals relative to time, thereby increasing the quality of the system.

Allowable Subject Matter

5. Claims 2, 4 & 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 2, Hongo and Shirali teach the distortion compensation table creation method according to claim 1, however they both fail to teach or suggest the method further comprising a step of relating said power to said distortion compensation signal when current said power is rising with respect to past said power and performing generation as rising-time compensation signal generation information a step of relating said power to said distortion compensation signal when current said power is falling with respect to past said power and performing generation as falling-time compensation signal generation information and a step of storing said rising-time compensation signal generation information and said falling-time compensation signal generation information in a table as said compensation signal generation information.

Regarding claim 6, Hongo and Shirali teach the transmitting method according to claim 5, however they both fail to teach or suggest the method further comprising a step of relating said power to said distortion compensation signal when current said power is rising with respect to past said power and performing generation as rising-time compensation signal generation information, a step of relating said power to said distortion compensation signal when current said power is falling with respect to past said power and performing generation as falling-time compensation signal generation information, a step of storing said rising-time compensation signal generation information and said falling-time compensation signal generation information in a table as said compensation signal generation information, and a step of selecting said distortion compensation signal by referencing said rising-time compensation signal generation information using information of said power when measured said power of

said baseband signal is on an upward trend, and selecting said distortion compensation signal by referencing said falling-time compensation signal generation information using information of said power when measured said power of said baseband signal is on a downward trend.

Regarding claim 4, Hongo and Shirali teach the distortion compensation method according to claim 3, however they both fail to further teach the method comprising a step of relating said power to said distortion compensation signal when current said power is rising with respect to past said power and performing generation as rising-time compensation signal generation information a step of relating said power to said distortion compensation signal when current said power is falling with respect to past said power and performing generation as falling-time compensation signal generation information, a step of storing said rising-time compensation signal generation information and said falling-time compensation signal generation information in a table as said compensation signal generation information, a step of selecting said distortion compensation signal by referencing said rising-time compensation signal generation information using information of said power when measured said power of said baseband signal is on an upward trend, and selecting said distortion compensation signal by referencing said falling-time compensation signal generation information using information of said power when measured said power of said baseband signal is on a downward trend.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sills et al (US 7,113,551) disclose a transmitter with limited spectral re-growth and method therefor.

Kirschenmann et al (US 7,010,278) disclose a sideband suppression method and apparatus for quadrature modulator using magnitude measurements.

Berliner et al (US 6,898,415) disclose a system and method for reducing multipath distortion in wireless distance measurement systems.

Taguchi (US 5,339,054) disclose a modulated signal transmission system compensated for nonlinear and linear distortion.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian A. Hannon whose telephone number is (571) 272-7385. The examiner can normally be reached on Mon. - Fri. 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. A. Hannon
June 13, 2007

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